

CLAIMS

1. A pneumatic actuator in the form of a cantilever, characterised in that
  - an airtight and elongated hollow body (1) of flexible material pressurised with compressed air by means of at least one valve (6) is present,
  - at least one compression member (2) is present, and the latter lies along a surface line of the hollow body (1) adjacent to the latter and is secured against displacement and buckling, furthermore
  - that at least one pair of tension elements (4) is present, which are laid pairwise in an opposite sense of rotation around the hollow body (1) in a helical fashion,
  - and that a first end of the actuator is connected to a reference system (8) and a second end (17) of the actuator can perform a movement and/or exert a force relative to the reference system (8) depending on the pressurisation of the hollow body (1) with compressed air.
2. The pneumatic actuator according to claim 1, characterised in that
  - the compression member is connected at one end to a reference system (8), furthermore
  - the at least one pair of tension elements (4) are fixed on the one hand to a free end of the compression member (2), for which purpose the compression member (2) has a node (3) at the free end for the mutual friction-locked fixing

of compression member (2) and tension elements (4) and so as to take up load forces,

- whereby, furthermore, the at least one pair of tension elements (4) is laid around the hollow body (1) in a helical and countra-rotational fashion with a half convolution and, on the other hand, is connected for its part in a friction-locked manner to a fixing point (9) connected in a friction-locked manner to the reference system (8),
- whereby the fixing point (9) and the compression member (2) lie in the plane of motion of the actuator.

3. The pneumatic actuator according to claim 2, characterised in that

- the compression member (2) is clamped at one end in a friction-locked manner by means of a connection piece (10) connected in a friction-manner to the reference system (8),
- the axial direction of the end of the compression member (2) clamped in the connection piece (10) remains essentially unchanged even under loading of the node (3),
- the compression member (2) is produced from flexible, flexurally elastic material and is bent under loading of the node (3).

4. The pneumatic actuator according to claim 2, characterised in that

- the compression member (2) is connected in a rotary and friction-locked manner to the reference system (8) by means of a hinge (7),

- the rotary axis of the hinge (7) stands at right angles both to the axial direction of the compression member (2) and to the connecting line of the hinge (7) to the fixing point (9),
  - the compression member (2) is produced from flexurally stiff material.
5. The pneumatic actuator according to any one of claims 1 to 4, characterised in that the actuator is reset from the activated position into the deactivated position by means of a spring element (11).
6. The pneumatic actuator according to any one of claims 1 to 4, characterised in that the actuator has a further fixing point (9) to the reference system (8) in the plane formed by the compression member (2) and the fixing point (9) and has in addition a second hollow body (1) as well as at least one further pair of tension elements (4), as a result of which the two extreme positions of the actuator regulating path can actively be occupied by the actuator.
7. The pneumatic actuator according to claim 1, characterised in that
- the compression member (2) is produced from flexurally elastic material,
  - the at least one pair of tension elements (4) are laid around the hollow body (1) in a whole turn or in multiples of a whole turn,
  - the at least one pair of tension elements (4) is fixed in a friction-locked manner respectively to the two ends of the compression member (2).

8. The pneumatic actuator according to claim 7, characterised in that the compression member (2) is connected to the reference system (8) partially in a friction-locked manner at the first end of the actuator.
9. The pneumatic actuator according to any one of claims 1 to 8, characterised in that means are present for pressurisation of the hollow body (1) with compressed air and for blowing the air out of the hollow body (1).
10. Use of a pneumatic actuator according to any one of claims 1 to 9 as a damping spring element.
11. Use of at least two pneumatic actuators according to any one of claims 1 to 9 as a gripping device.
12. Use of a pneumatic actuator according to any one of claims 1 to 9 as a cantilever with constant pressurisation of the hollow body.
13. Use of a pneumatic actuator according to any one of claims 1 to 9 for the production of a pneumatically driven belt server.